The Official Action objected to the title of the invention. Responsively, the title has been amended to that suggested by the Official Action.

Claim 4 has been amended responsive to the noted formal matter.

The Official Action rejected the pending claims under §103 as obvious over NEC Corp. (JP 11-168094) in view of DHINDSA et al. 6,245,192.

The Official Action refers to Figure 5 of the NEC Corp. reference.

NEC Corp. discloses an apparatus for suppressing powder-like deposition on chamber parts, and layer sublation from the chamber parts. See translation page 2 of 12, paragraph 10.

At paragraph 11, it is disclosed that to solve these problems, an interval mesh plate electrode for plasma separation is provided between the plasma generating zone and the substrate processing zone (translated as the plasma occurrence room and the substrate processing room).

As per translation page 4, paragraph 28, the disclosed apparatus includes RF electrode 1 containing the gas showerhead, back electrode 2, and interval mesh plate electrodes 11. Mesh plate electrodes 11 are shown in Figures 1-2.

There are also ring-like material injector 8 and ring-like inert gas injector 23. The inert gas injector 23 is located

below mesh plate electrodes 11 and above the monosilane gas source 9, as per paragraph 31.

Paragraph 32 details an alternative to ring-like injector 23, i.e., a flat surface injector as per Figures 3-4. This injector corresponds to that disclosed in Figures 7-8 of the present application.

Paragraph 34 begins the disclosure as to Figures 5-7. Element 29 is disclosed as interval mesh plate electrode 29 with an inert gas source 24 per Figure 4. Accordingly, mesh plate electrode 29 has the same structure of plasma confining electrode 8 of present application Figures 7-8.

With the last paragraph of page 4 of the Official Action, it is acknowledged that the NEC Corp. reference does not disclose the recited plasma confining electrode with gas dispersion plates within the hollow structure as per claim 1 or the gas introducing member with gas dispersion plates within the hollow structure as per claim 4. However, the Official Action stated that it would have been obvious to modify the structure accordingly, stating that baffle plates within a hollow structure were known in the art. Specifically, the Official Action offers DHINDSA et al., column 3, line 64 to column 4, line 9 as well as Figure 2 showing plural parallel dispersing plates 30A-30C.

The Official Action is correct that this reference shows a gas distribution system for a parallel plate plasma reactor. The disclosure is to a showerhead 22 defining a sealed

gas distribution chamber 24. There is a baffle assembly 26 including one or more baffle plates 30A-30C. The teaching here is uniformly distributing gas from a showerhead.

Applicant acknowledges that this teaching might suggest using baffle plates in a showerhead, e.g., perhaps in the showerhead of RF electrode 1 of the NEC Corp. reference.

Applicant, however, does not see that using baffles in a showerhead suggests the recited structure of the present inventive plasma confining electrode.

Note that the recited plasma confining electrode includes "holes for passing the first gas containing neutral radicals from the first gas plasma" to the substrate processing zone; and horizontal gas dispersing plates with "holes for introducing the second gas into the substrate processing zone."

Reference is made to Figure 2 of the present application showing the recited structure. In this structure, and unlike the secondary reference, there is a hollow structure defined by an upper and lower plate, and within this hollow structure there are vertical holes 5 which pass the first gas containing the neutral radicals from the first gas plasma to the substrate processing zone, and additionally there are the horizontal gas dispersing plates which include holes for introducing the second gas into the substrate processing zone.

Although the secondary reference may teach the relatively simple structure of having baffle plates to uniformly

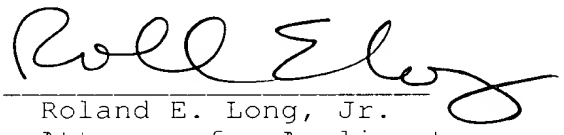
disperse a gas within an enclosed volume, there is no suggestion of the recited structure (as per Figure 2). That is, there is no teaching or suggestion of using gas dispersing plates within a hollow structure already including holes for passing a first gas while the gas dispersing plates separately and independently act for uniformalizing a second gas. Accordingly, the obviousness rejection is not believed to be viable.

Reconsideration and allowance of all the pending claims are therefore respectfully requested.

Attached hereto is a marked-up version showing the changes made to the abstract and claims. The attached page is captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE."

Respectfully submitted,

YOUNG & THOMPSON

By 

Roland E. Long, Jr.
Attorney for Applicant
Registration No. 41,949
745 South 23rd Street
Arlington, VA 22202
Telephone: 703/521-2297

August 22, 2002

ABSTRACT OF THE DISCLOSURE

A remote plasma CVD apparatus in which oxygen gas is supplied to a high frequency wave applying electrode to cause reaction of oxygen radicals and oxygen molecules with monosilane gas, which is introduced into part of a substrate processing zone outside oxygen plasma. The apparatus includes a plasma confining electrode, which has jetting holes for supplying monosilane gas to the substrate processing zone. The electrode is spaced apart from a substrate by a distance no longer than about 1,500 λ_g of the mean free path in the substrate processing zone at the time of film formation. The member has a hollow structure, and accommodates dispersing plates for uniformalizing monosilane gas in it.

B1

"VERSION WITH MARKINGS TO SHOW CHANGES MADE"

ABSTRACT OF THE DISCLOSURE

A remote plasma CVD apparatus [is disclosed,] in which oxygen gas [18] is supplied to a high frequency wave applying electrode [1] to cause reaction of oxygen radicals and oxygen molecules [21] with [monisilane] monosilane gas [19], which is introduced into part of a substrate processing zone [R] outside oxygen plasma [22]. The apparatus [comprises] includes a plasma confining electrode [20] , which has jetting holes for supplying monosilane gas [19] to the substrate processing zone [R]. The electrode [20] is spaced apart from a substrate [3 (i.e., deposition substrate)] by a distance no longer than about 1,500 λ_g of the mean free path in the substrate processing zone [R] at the time of film formation. The member [20] has a hollow structure, and accommodates dispersing plates [(i.e., a first and a second dispersing plate)] for uniformalizing monosilane gas [(i.e., neurtral gas)] in it. [Thus both of suppression of excessive progress of gas phase chemical reaction and homogeneous film formation in a remote plasma CVD apparatus for forming film by gas phase chemical reaction are realized.]

IN THE CLAIMS:

Claim 1 has been amended as follows:

--1. (amended) A plasma CVD apparatus comprising a substrate processing zone with a deposition substrate area

disposed therein, a plasma generating zone for generating plasma of a first gas, and a plasma confining electrode for separating the substrate processing zone and the plasma generating zone and confining the first gas and having holes for passing the first gas containing neutral radicals from the first gas plasma, wherein[:]

the plasma confining electrode has a hollow structure, accommodates horizontal gas dispersing plates within the hollow structure for uniformalizing a second gas in the plasma confining electrode, and has holes for introducing the second gas into the substrate processing zone to form a desired film on [the] a deposition substrate located on the deposition substrate area by gas phase chemical reaction of the first gas containing neutral radicals and the second gas with each other; and

the vertical distance between the plasma confining electrode and the deposition substrate is no longer than 1,500 times the mean free path λ_g of a blend gas of neutral radicals and the second gas in the substrate processing zone at the time of film formation.--

Claim 4 has been amended as follows:

--4. (amended) A plasma CVD apparatus comprising a substrate processing zone with a deposition substrate area disposed therein, a plasma generating zone for generating plasma of first gas, and a plasma confining electrode for separating the

substrate processing zone and the plasma generating zone and confining the first gas and having holes for passing first gas containing neutral radicals from the first gas plasma, wherein[:]

the plasma CVD apparatus further comprises a gas introducing member disposed between the plasma confining electrode member and the deposition substrate and having a plurality of holes, through which a second gas is introduced into the substrate processing zone to form a desired film on [the] a deposition substrate by gas phase chemical reaction between the first gas containing neutral radicals and the second gas; and

the gas introducing member has a hollow structure, accommodates dispersing plates within the hollow structure for uniformalizing the second gas in [it] the gas introducing member and is vertically spaced apart by a distance no longer than about 1,500 times the mean free path λ_g in the substrate processing zone.--